The non-use and influence of UK energy sector indicators

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The non-use and influence of UK Energy Sector Indicators

Dr Markku Lehtonen
Research Fellow
Sussex Energy Group
SPRU – Science and Technology Policy Research, University of Sussex, Brighton, United Kingdom
AND
IFRIS, Université de Paris-Est Marne-la-Vallée, Paris, France

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Abstract

This paper presents the results from a case study on the role in policymaking of UK Energy Sector Indicators (ESIs), introduced by the government in 2003. The findings show that the ESIs constituted a very minor element within the broader evidence-base used by policymakers, and that this indicator set and their objectives were poorly known even to central players in the sector. The findings of this research provide further evidence for the observation that scientific knowledge (including evaluations, assessments and indicators) seldom play an instrumental role in policymaking, and are more likely to produce indirect, conceptual and political impacts. The analysis provides a number of tentative conclusions concerning such potential indirect impacts that accrue mainly through processes of dialogue and argumentation both during the preparation of the indicators and after their publication as part of the annual reporting by the UK energy department. The ESIs have played various conceptual and political roles, yet the concrete outcomes in terms of policy change remain to be explored. The conclusions highlight the limitations of rationalist notions of direct, instrumental use in the efforts to understand the role of indicators in policymaking. The paper concludes by three tentative propositions concerning the explanations to the absence of instrumental role of the ESIs, which could be usefully explored in future research: the characteristics of the energy sector; the characteristics of the UK policy culture; and the exceptionality of the ESIs in the general evidence-base of UK energy sector.

Keywords: energy indicators, knowledge use, energy sector, models of policymaking

Highlights

- The role of Energy Sector Indicators (ESIs) in UK energy policy between 2003 and 2009 was analysed
- The ESIs were very poorly known, and therefore little used, even by central players in UK energy sector
- The ESIs produced a number of indirect effects on framing, agenda-setting and legitimacy
- Indirect and unintended impacts, shaped by the general political and institutional context, deserve more attention in indicator work.

1. Introduction

The energy sector is arguably a policy area in which the use of quantitative data, including indicators, would be expected to play a central role in policymaking. After all, in arguing their case, actors in the policy debate make widespread use of statistics and quantitative information about energy production, markets, technologies, emissions, etc. A large proportion of the experts working in the area are trained in hard sciences, engineering and economics, and should hence be accustomed to using quantitative data in their daily work. Moreover, the UK has been a forerunner in the evidence-based policy 'movement', manifest in the widespread adoption of New Public Management approaches such as performance measurement (e.g. James 2004; Dunleavy et al. 2005; Bouckaert and Halligan, 2007; Hood 2006; 2007; 2008). One might therefore expect that, if anywhere, it is in the UK energy sector that one might find evidence for more direct use of expert knowledge in the form of indicators. In other words, the UK energy sector could provide evidence contrary to the widespread findings from earlier research on the role of scientific knowledge in policymaking, which have repeatedly demonstrated that direct use of scientific and expert knowledge to shape decisions is rather an exception than a rule, and that evaluations, assessments, scenarios and indicators far more often influence policies indirectly, for example by shaping of frameworks of thought or providing policy actors 'ammunition' for their political battles.[1] Intuitively, one could therefore presume that the UK energy sector would exhibit a "rational" and number-oriented policy culture, offering favourable conditions for instrumental use of indicators as direct input to policymaking.

The findings from a case study on the role of the UK Energy Sector Indicators (ESIs), launched with the Energy White Paper in 2003, revealed quite a different story, however. The study was conducted as part of the EU FP7-funded research project, POINT – Policy Influence of Indicators (2008-2011).[2] The initial objective of the case study was to examine the degree and the ways in which the ESIs had helped reshape the country's energy policy, notably by contributing to the two observed recent trends: return to opacity and increasing status of energy security. Between 2003 and 2008, the priorities in UK energy policy had shifted, as energy

[1] On the role of scientific knowledge in general, see e.g. (Romsdahl, 2005), on evaluations, see e.g. Henry and Mark

[2] POINT received funding from the EU 7th Framework Programme on research under the Grant Agreement number 217207.

security regained its position as the main concern – to the detriment of climate change mitigation – and the policy style again became more authoritarian, after a brief interlude of participatory policymaking in the early 2000s (Lovell et al. 2009; MacKerron 2009). In practice, it became clear early on in the project that it would be difficult, if not impossible, to identify the role of the ESIs in these policy shifts, especially because of the very limited awareness that even key policy actors had of the existence of this indicator set. Contrary to our expectations, the UK energy sector did not seem to constitute an exception to the observation from earlier research about the rarity of instrumental role of scientific knowledge in policymaking. And yet, the absence of use and knowledge about the ESIs contrasted with the high visibility of notably the performance management indicators in UK government – even though their actual impact on improving performance has been called into question (e.g. James 2004; Hood 2006; 2008). The central aims of the case study therefore became to 1) identify the reasons for the lack of use and awareness of the ESIs among key players in the UK energy sector; and 2) examine whether the ESIs, despite the near absence of instrumental role, nevertheless produced indirect impacts.

This study was largely of an exploratory nature. More detailed research applying for instance more intensive methods of participant observation and longer time periods of observation would be needed to examine the causal relations between the design and use of indicators on the one hand, and policy dynamics on the other. The paper therefore concludes by suggesting a number of propositions that could be explored in more in-depth research on the actual impacts of indicators on policymaking. A practical impediment to conducting such research within the case study presented here was the low level of knowledge, awareness and interest of relevant policy actors concerning the ESIs. As a consequence, it turned out to be difficult to obtain information about the indicator production and use, be it through interviews or otherwise. Notwithstanding the usual, as such valid, explanations such as the tight agendas of civil servants and other energy sector professionals, the remarkable difficulties of the researcher to attract people to participate in the indicator workshop[3] constituted further evidence of the low priority that ESIs enjoy in UK energy policy.

[3] About 115 individuals were contacted through e-mail, and a second and a third invitation were sent when necessary. The personal contacts of the Sussex Energy Group researchers were mobilised in order to maximise the likelihood of positive responses. The personal networks of interviewees were likewise utilised, by asking these to recommend further colleagues for interviews. Only thirteen individuals finally participated in our workshop.

The material for the research consisted of an analysis of government documents relating to the Energy Sector Indicators; semi-structured interviews with 15 experts, stakeholders and civil servants from the UK energy sector (marked in the text as I1, I2, etc.); participant observation in a stakeholder workshop on energy sector indicators organised as part of the research project; and an analysis of the prevalence of indicator-related discussion in major UK national newspapers. Annex C provides further detail on the data and research methods.

The paper is structured as follows. Section 2 presents the conceptual framework, including in particular a typology of different roles of indicators in policymaking, and a distinction between the 'use' and 'influence' of indicators. Section 3 presents the results from the case study in three phases: a description of the ESIs; the main types of use – and the possible reasons for the weak use of these indicators; and an analysis of the mostly indirect types of influence that the ESIs had on policymaking. Section 4 concludes by drawing the main lessons and examining the reasons for the observed use and influence of the ESIs.

2. Conceptual framework

2.1 The multiple roles of knowledge in policymaking

The three broad roles commonly attributed to expert knowledge in decision-making in earlier 'knowledge-use' literature (e.g. Weiss, 1987; Henry and Mark, 2003; Romsdahl, 2005, 141) were taken as the starting point for analysis in this case study:

- instrumental role – information is used for specific decisions or requested by decision-makers for specific projects; this role is closely related to the "rationalist-positivist" model of, which portrays policymaking essentially as an rational and linear process of problem-solving (Boulanger 2007);
- conceptual or 'enlightenment' role – knowledge provides a broad information base for decisions by providing conceptual frameworks and fostering different types of learning in the spirit of 'communicative rationality' (Habermas, 1984); the conception of policymaking

closest to this role of knowledge is what Boulanger (2007) calls the discursive-interpretative model, in which policymaking is perceived as a struggle over the definition, explanation and interpretation of public problems;

- political role – justifying or legitimising policies, decisions and actors or postponing actual decisions; the corresponding policymaking model is 'strategic': politics is seen as pure competition between private conflicting interests without any necessary reference to common good, rationality or similar overarching principle (Boulanger 2007).

Boulanger (2007) further argues that the policymaking models are not mutually exclusive, but instead their relevance depends on the particular temporal and spatial context and type of problem. None of the three models possesses inherently superior explanatory power, but their respective adequacy depends on the context in question – in particular the policy institutions and the stage of the decision-making process. Furthermore, just like there are overlaps between the three policymaking models – a combination of models often being more powerful than any of the three alone – the three roles of indicators often overlap and synergies and trade-offs between the roles are frequent.

Indicator influence – and hence also their roles – can be further conceptualised through theories and typologies of social learning[4]. The instrumental role mainly implies 'simple' or 'single-loop' learning, helping policy actors to learn about the consequences of specific actions, whereas the conceptual and political roles would correspond to more 'complex' forms of 'double-loop' learning, i.e. stimulating reflection on the assumptions underlying policy actions, or even 'triple-loop' learning, which would prompt actors to challenge the values, norms, and higher-order thinking processes that underpin assumptions and actions (Argyris and Schön, 1978; Reed et al., 2010). In reality, the distinctions are more complex than suggested by such a simple typology. Importantly, even assessments built upon a rational model of policymaking, and intended to influence policies directly, may inadvertently generate more complex forms of learning (Owens et al., 2004; de Lancer Julnes, 2006, 224). Given the apparent absence of instrumental role of the

[4] To qualify as social learning – and to distinguish it from individual learning – a learning process must fulfil three criteria. It must (1) demonstrate that a change in understanding has taken place in the individuals involved; (2) demonstrate that this change goes beyond the individual and becomes situated within wider social units or communities of practice; and (3) occur through social interactions and processes between actors within a social network (Reed et al., 2010).

ESIs, the identification of the possible indirect and unintended effects – be they positive or negative – became a major task in the UK energy sector case study.

2.2 Use or influence of indicators?

A crucial distinction underpinning this research identifies the use and influence of indicators as two separate, yet interrelated concepts. The distinction builds on a series of attempts (e.g. Knott, J., Wildavsky 1980; Rich and Oh 2000; Mark and Henry 2003; Boulanger, 2007) to distinguish discrete stages in the pathways between information and policy (e.g. the existence, accessibility, collection, uptake, digestion, use, influence, impact, and discard of information). Instead of seeking to cover the full range of possible stages, our research limited the framework to 'use' and 'influence', with the latter as the organising concept for the analysis. As opposed to use, which tends to focus the attention only on intended use in the policy domain in question, influence covers the entire range of intended and unintended, direct and indirect impacts of indicator use and production. This influence cannot be reduced to mere 'usefulness', which is always linked to a given perspective; one needs to ask 'useful for whom and for which purpose?' Adopting 'influence' as the key concept also helps to avoid an excessively normative approach; a researcher focusing on 'use' may at least unintentionally tend to concentrate on intended use, seeking to identify the 'intended user', and thereby draw attention away from the broader range of potential other users or affected parties.[5] In brief, it is one thing to analyse whether an indicator (or an evaluation) is used in the intended way and quite another to assess the actual consequences of indicator development and use.

'Influence' also covers issues such as the relationships between indicators and democracy (on similar debates concerning evaluation and democracy, see e.g. Hanberger, 2001; Pollitt, 2006). Ideally, evaluations and indicators can enhance the 'reflexivity' of modernisation (Giddens, 1990) and 'deliberative democracy' (e.g. Elster, 1998; Dryzek, 2000) by fostering more inclusive

[5] Mark and Henry (2004, 39) highlight these problems by noting that "the problem in part is that 'use' is sometimes treated simply in a *descriptive* way, referring to whether or not some potential consequence of evaluation (such as an instrumental decision) *did* happen; while at other times 'use' is applied as a *normative* concept or guiding purpose for evaluation, referring to consequences of evaluation that *should* happen (Mark and Henry, 2004, 39). When treated normatively (e.g. 'find an intended user'), attention to use can push evaluation in directions that may be undesirable from the vantage of other stakeholders (Henry 2003; Williams et al. 2002)."

and participatory policymaking, as well as reasoned debate among various stakeholder groups, and thereby promote sustainability through learning (e.g. Baron, 1999; van der Knaap, 1995). From a rational-positivist perspective, indicators can strengthen democracy by enabling citizens to better monitor and control the activities and performance of administration and elected decision-makers (e.g. Vedung, 1997; 2006). On a more negative note, especially performance management indicators can have perverse impacts, including those on democracy. Commonly mentioned downsides of performance measurement include their tendency to 1) discourage innovation, creativity and risk-taking; 2) encourage justification instead of policy improvement; 3) foster dissimulation of information and even cheating; and 4) overlook the plurality of values and points of view (Perrin, 1998; Blalock, 1999; Davies, 1999; Winston, 1999; Perrin, 2002; van der Knaap, 2006; Mucchielli, 2008). These potential downsides of indicators point to the obvious: maximising the 'use' or 'influence' of indicators is alone an insufficient and potentially misleading objective for policy practice and for research on the role of indicators. More is not always better.

Finally, research on the role of evaluation in policymaking has underlined the importance of the so-called *process use*, i.e. the influence that the evaluation processes may provoke among the participants by for example promoting social learning, networking, and increased focus and motivation among the policy actors (e.g. Patton, 1998; Forss et al., 2002). Broad participation of stakeholders is generally considered as a key precondition for useful and influential indicators, whether that influence is expected to follow from the process of indicator production or from the use of the indicators once they have been introduced (e.g. Bell and Morse, 2003; 2008; Mickwitz and Melanen, 2009).

2.3 Categories of use

Indicator 'use' was likewise included as an analytical category, but the notion was limited to relatively direct types of 'handling' of indicators in a policy process. Four major categories of use were outlined: reception, internal application, external application, and decision support (table 1). In terms of the three general roles of indicators, 'use' primarily denotes the direct,

instrumental forms of use, whereas a lot of the 'influence' refers to the conceptual and political roles of indicators.

Table 1. Types of use of indicators (source: Gudmundsson et al. 2009)

1. Reception
• Receive, notice, observe
• Forward to others (no change in indicator)
2. Internal application
• For own work (calculation/text)
• Use in internal communication
3. External application
• Communication with other policy institutions
• Communication with stakeholders
4. Decision support
• Use in official policy plan/report/document
• Use for making a judgement and a decision

2.4 Categories of influence

Drawing on the conception introduced by Valovirta (2002) about evaluation influence as argumentation, that of Henry and Mark (2003) on 'evaluation influence', and Forss et al. (2002) on 'process use, four analytical categories were constructed in order to organise the analysis of indicator influence. Firstly, the *pathways* of influence consist essentially of the processes of dialogue and argumentation – either during the process of indicator preparation ('process use') or following the release of the indicators (entailing different types of 'use'). Secondly, in line with earlier research emphasising the importance of unintended and unforeseen impacts (see e.g. Vedung 1997; Perrin 1998; Hood 2006; McLean et al. 2007), influence can take place in different *'target areas'*: the intended policy, other policies, and what could be called as 'non-policy impacts' such as those concerning administrative structures or the operation of democratic institutions. The third category distinguishes between four different *types of influence*: new or reconfirmed decisions and actions; new or reconfirmed shared understandings; networking among policy actors; and the legitimacy of policies and policy actors. Finally, an analysis of the above-mentioned three categories serves to allocate influence into one of the three *roles of*

indicators evoked above: instrumental, conceptual and political role. Table 2 summarises the elements for characterising indicator influence, while table 3 presents the relationships between the roles of the indicators, and the different elements of influence.

Table 2. Elements for characterising indicator influence

Pathways

- Dialogue and argumentation during the process of indicator design ('process use')
- Dialogue and argumentation once the indicators have been released

Target areas

- The intended policy
- Other policies
- Non-policy impacts

Types of influence

- New, modified or reconfirmed decisions and actions
- New, modified or reconfirmed shared understandings
- Networking
- Legitimacy of policies and policy agents

Role of indicators

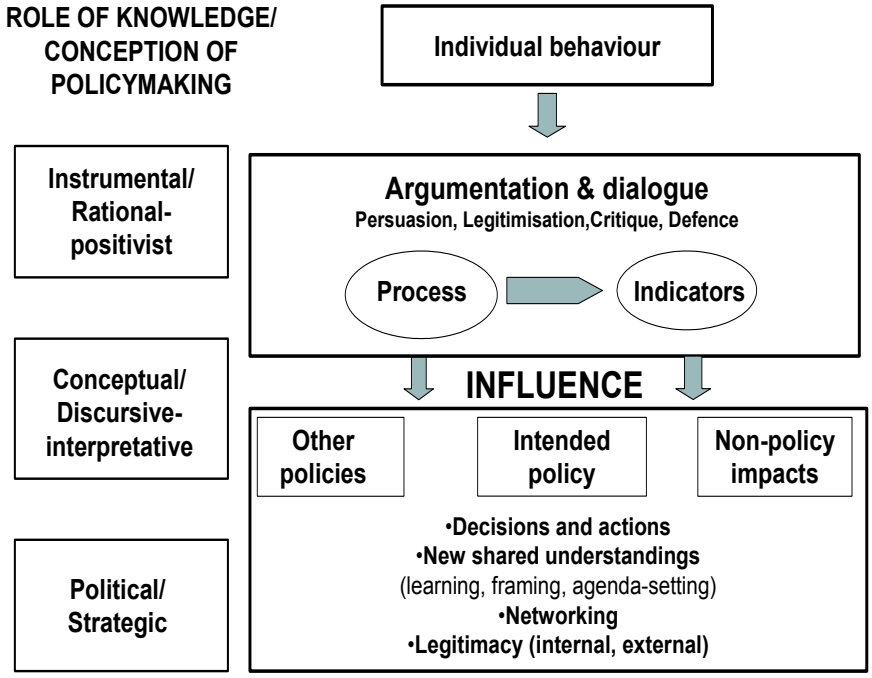
- Instrumental
- Conceptual
- Political

Table 3. Relationship between the roles of indicators, sources of influence, the target area of influence, and the types of influence.

Role of the indicators	**Instrumental**	**Conceptual**	**Political**
Pathway of influence	Indicators	Process of indicator elaboration Indicators	Process of indicator elaboration Indicators
Target area of indicator influence	Intended policy	Intended policy Other policies Non-policy impacts	Intended policy Other policies
Type of indicator influence	Decisions and actions	Understandings Networking	Legitimacy

Figure 1 summarises the conceptual framework used in order to explore the roles of the UK Energy Sector Indicators in policymaking. The main objective of the research was to describe influence at the interpersonal and collective levels, while the research approach adopted here allowed only anecdotal evidence to be gathered about influence at the individual level.

Figure 1. Summary of the types of indicator influence.



3. UK energy sector indicators – the case study

The UK Energy Sector Indicators (ESIs) were launched in association with the Energy White Paper in 2003. The set was not completely new, but largely a collection of indicators that the Department of Trade and Industry, DTI (responsible for energy policy),[6] had published since the 1990s in numerous UK energy sector publications. The mandate for the ESIs came from the Energy White Paper from 2003, which called for the development of a set of indicators in order

[6] The responsibility for energy policy was shifted in the government reorganisations in the late 2000s, first from the Department for Trade and Industry (DTI) to the Department for Business, Enterprise, and Regulatory Reform (BERR) in 2007; and then, in October 2008, to the Department of Energy and Climate Change (DECC).

to allow more focused analysis of progress towards the four overarching energy policy goals.[7] The main novelties of the ESIs were the presentation of the numerous indicators in a single report, and the introduction of the four headline indicators, to monitor progress towards the key objectives of UK energy policy, as outlined in the 2003 White Paper: tackling *climate change*, ensuring *energy security* (*reliability*) and the *competitiveness* of energy markets, and eradicating *fuel poverty*.

An initial set of indicators was published along with the White Paper. Based on comments received from stakeholders, a revised set of indicators was published in 2004. The ESIs consisted of four headline indicators (one for each goal), 28 supporting indicators[8], and about 140 background indicators, grouped under five main headings. The headline indicators and the accompanying graphic illustrations published in the 2004 edition of the UK Energy Sector Indicators (DTI 2004) are presented in annex A, while Annex B provides the list of the 27 'supporting indicators', as presented in the 2004 ESI publication.

Until 2007, the four headline and the 28 supporting indicators were published together with the annual reports on progress towards implementing the White Paper's conclusions and recommendations.[9] The background indicators were made available on the ministry's website, some weeks after the release of the headline and supporting indicators. To comply with the requirements stipulated for the official National Statistics publications, the annual publication date was from 2008 onwards no longer tied to a policy document, but had to be fixed and pre-announced according to the National Statistics rules. The main reason for this was the objective to ensure that indicator production would be as independent as possible from political

[7] The White Paper (DTI, 2003, 113) stated: "*We will need appropriate indicators to monitor progress. Government already publishes an extensive range of energy indicators, and these will continue to be published annually. But we need to focus on a smaller set of indicators to give a broad overview of whether overall energy policy objectives are being delivered.* ***Therefore, as a supplement to the white paper, we will be seeking views on the most appropriate indicators to focus upon."*** *(emphasis in the original text)*

[8] Eleven supporting the climate goal, seven relevant to energy security, five to competitiveness, and five to fuel poverty.

[9] The indicators were published each year in two phases: the key and supporting indicators were released in July, and the background indicators in October.

interference. In 2009, following an assessment by the National Statistics Authority (UKSA, 2009), the ESIs were granted the status as National Statistics.[10]

3.1 Use of the indicators: the (modest) role of the ESIs as part of the evidence-base for energy policy

The most obvious form of use of the ESIs was as part of the annual reporting by various government bodies: monitoring progress towards the four policy goals introduced in the White Paper 2003; reporting by the Fuel Poverty Advisory Groups in England, Wales and Scotland; and reporting by the Joint Energy Security of Supply Working Group (JESS) on energy security. An assessment of the ESIs by the statistics authority emphasised the primary role of the indicator set in providing general background knowledge, concluding that the ESI publication was mainly used for "research, monitoring trends, policy research & development, and education" (UKSA 2009). The interviewed energy department officials responsible for the production of ESIs said they sent the indicator report each year to their potentially interested colleagues, but admitted not being aware of the extent to which these colleagues actually made use of the indicators. These forms of use fall within the category of 'reception' in our typology of types of use (see table 1 above). None of the interviewees, whether academics, former energy department officials, NGO representatives or energy industry stakeholders, stated that they would use the ESIs in their daily work. Hence, the "internal application" (table 1) of ESIs seems to have been rare. By contrast, some DECC[11] interviewees mentioned the use of the indicators by the Department officials in preparing government responses to parliamentary questions posed by the MPs (Members of the Parliament), i.e. for 'external application'.

The ESIs also seemed to be seldom used by groups outside the government. In line with the argument made by Godin (2002, 25-26) – that private sector actors often do not use government statistics, simply because they already have their own key internal indicators – many

[10] This designation means that the statistics are deemed to be compliant with a Code of Practice, and therefore "meet identified user needs; are produced, managed and disseminated to high standards"; are well explained; "readily accessible, produced according to sound methods and managed impartially and objectively in the public interest" (UKSA, 2009).

[11] The Department of Energy and Climate Change (DECC) was created in October 2008 by merging sections of BERR (Department for Business, Enterprise and Regulatory Reform) responsible for energy policy, and Defra (Department for Environment, Food and Rural Affairs), hitherto responsible for climate policy.

interviewees said they would use either their own data or use the ESIs as a background to formulate their own, more up-to-date, tailor-made and disaggregated indicators (e.g. I11; I14). None of the interviewees deemed it likely that MPs would make any significant use of the ESIs. Some suggested that the interest in the ESIs was in decline among actors in the energy sector, because the changes in energy policy priorities over the years had made the indicators partly obsolete (I9; I10; I12). Our media analysis (see Annex C for details) provided some evidence for such a declining interest: while the ESIs were virtually absent from media debate, their launching in 2003 was nevertheless reported by some private actors in the energy sector,[12] and at least some stakeholders[13] reacted to the government's request for comments. By contrast, the more recent requests by DECC (in 2009 and 2010) for comments on ESI went unanswered.[14] Yet, the ESIs were used by various stakeholders for strategic purposes (hence playing a political role), for instance by environmental and social sector NGOs to criticise the government for its failure to achieve its climate and fuel poverty targets (I9; I13), or by industry customers to justify public investments in gas storage facilities (I10). In particular, many interviewees mentioned that despite its relatively poor quality, the fuel poverty indicator proved politically highly useful, in particular as an "inexhaustible source of criticism" given that the target of eradicating fuel poverty was virtually impossible to achieve (I9; I15). Finally, little evidence was found of use of the ESIs as true decision-support tools beyond an occasional reference to them as a source of background information in policy documents.

Summing up, a major general finding of the analysis was the rather striking absence of interest and even awareness of the existence of the ESIs among central players in UK energy policy. Most of the interviewees were hardly at all familiar with 'indicator language', as reflected in comments by the interviewees such as: "what do you mean by indicators?", and "do you mean statistics?" The same demand to explain the meaning of the term indicator was frequently made by the energy sector actors when invited to participate in the stakeholder workshop. The conversation during the interviews often tended to slip into a general discussion about data and statistics. Moreover, the government had apparently never clearly identified the intended users of

[12] For instance in an energy consultancy IPA monthly newsletter, with brief commentary on each of the four headline indicators (http://www.ipaenergy.co.uk/publications/70934monthlybriefingapr2004.pdf).
[13] For example Scottish Natural Heritage: May 2003, Ref: PS 63/03.
[14] Response by a member of the DECC Statistics Team to an e-mail by the author, 3 November 2010.

the ESIs, and the UKSA (2009) assessment noted user engagement beyond industry stakeholders as a major area for improvement of the ESIs.[15] This lack of a clearly identified target audience was evoked as a shortcoming also in the associated work on energy security and fuel poverty indicators (we shall return to this issue further down in this article).[16] Many interviewees emphasised that the ESIs were only one, and a relatively minor, part of the evidence base underpinning energy policy, especially when compared with the statistics publication, "Digest of UK Energy Statistics" (DUKES).[17] An energy department statistician responsible for ESIs responded to the question on the intended functions of ESIs by simply stating: "we produce these indicators because we have an obligation to do so".

It soon therefore became clear that it would be difficult to answer the original research question posed for this research project, i.e. analysing what role the ESIs had played in the recent shifts in energy policy. To put it in another way, the ESIs obviously very seldom played an instrumental role in policymaking, and were unknown even to many of the policy insiders in the UK energy sector. The major tasks became to explain this apparent lack of both interest in and knowledge of the ESIs, and to examine the potential indirect (i.e. conceptual and political) impacts from the production and use of ESIs.

Sections 3.2 and 3.3 will examine, respectively, the influence of the processes whereby the ESIs were developed, and influence from the indicators themselves.

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[15] The assessment of the ESIs by UKSA (2009) notes the "wide range of users of energy statistics" (policy-makers in Government, the energy industry, international organisations and academics) about whom the DECC statisticians had told the assessment team, and recognises the ESI publication to have "a clear purpose: to monitor progress towards the key goals of UK energy policy". However, the foreseen types of use of the ESIs or their specific users were not identified in the key policy documents, neither could the interviewees point out such specific uses and users of ESIs.

[16] In line with the conclusions by the UKSA (2009) assessment, which noted that ESIs are intended to "less specialist users", some interviewees (e.g. I9 and I10) doubted whether JESS and the security indicators had served their primary objective of increasing the weight of energy security in energy industry decision-making, arguing that industry players were more likely to obtain their data elsewhere, and notably produce their own data and statistics, rather than use indicators produced by JESS. This opinion was further confirmed by another interviewee, who could not recall any occasion at which industry would have used the JESS indicators strategically, to justify and legitimise given energy policy options. Fuel poverty indicators provoked similar reactions: fuel poverty action groups and local authorities would, at best, use government indicators as baseline for constructing their own indicators adapted for their particular needs.

[17] Other key publications within this evidence-base mentioned by the interviewees include the UK Energy Trends, Quarterly of Energy Prices, Energy in Brief, and Energy Consumption in the UK.

3.2 Influence pathway I: The process of indicator development

The first possible pathway for conceptual and political roles of indicators is the process whereby the indicators are elaborated. For the ESIs as a whole, this pathway of influence remained underexploited, and the resulting impacts through networking and generation of shared understandings appeared weak. Some of the indicator processes indirectly feeding to the ESI work, however, proved more influential.

3.2.1 'Process use' and exclusionary processes of indicator development

The processes of development of the ESIs also reflected the above-mentioned lack of interest in the ESIs. As noted above, the explicit request in the White Paper 2003 for comments on the indicator set triggered few responses, and the design of the ESIs was an essentially government-managed process, led by energy ministry statisticians (e.g. I4; UKSA 2009). A consultative process was initiated in 2004 to improve the methodology underpinning fuel poverty indicators (work whose one purpose was to feed into the ESIs),[18] but – as admitted by the involved energy sector officials (e.g. I4) and pointed out by an academic and a regional-level policymaker (I6, I11) – the collaboration with academics, advocacy groups, and regional-level policymakers hardly went beyond mere consultation and one-way transmission of information from the government to stakeholders. Furthermore, even if the government interviewees and workshop participants did not call into question the usefulness of consultation as such, they frequently portrayed its main function as provision of information and an enhanced evidence-base for decision-making by the administration and policymakers (e.g. I1; I4). Indeed, the National Statistics Authority's assessment of the ESIs (UKSA, 2009) evoked the lack of user engagement as a major obstacle preventing the ESIs from acquiring the status of National Statistics.

[18] In 2004, the DTI and Defra instigated a peer review "to independently assess the methodology by which fuel poverty figures are calculated". The peer review was supported by a three-month consultation process, and gave rise to the setting up of a fuel poverty methodology working group, which continues to meet regularly. *http://www.decc.gov.uk/en/content/cms/statistics/fuelpov_stats/fuelpov_stats.aspx*

3.2.2 "Isolationism" of the energy sector indicators as a reason for shortcomings in 'process use'?

Possibilities for learning and networking through 'process use' were further compromised by the weak links between the development of the ESIs and other indicator processes. According to energy sector authorities responsible for ESIs, no arrangements were in place to coordinate the ESI work with that of the UK sustainable development indicators. Interaction between energy indicators at the national and regional levels also seemed weak, as the ESIs were produced primarily for national level, and the regional administration was not involved in their preparation (I4; I6).[19] There seemed to be somewhat stronger links between the ESIs and the local-level indicators, notably through the information from some of the 188 local level performance indicators (National Indicators – NIs), which regularly fed into the ESIs.[20] Finally, there was a link, even though a tenuous one, between the ESIs and the highly influential government-wide performance measurement indicators,[21] to the extent that the few energy-related performance indicators largely derived from the ESI set.

3.2.3 'Process use' in JESS

If the absence of stakeholder involvement and coordination between ESIs and other indicator processes within the government led to a mismatch between the demand and the supply of indicators, thereby compromising social learning, 'process use' constituted a more prominent part of the efforts to develop energy security indicators within the Joint Energy Security of

[19] The government has developed regional and local level energy indicators, and in its discourse underlined the importance of local and regional decision-making for the delivery of national energy policy objectives, in particular the function of indicators in helping local and regional level stakeholders to enhance energy efficiency (http://www.berr.gov.uk/energy/statistics/regional/index.html, retrieved 2 April 2009).

[20] The NIs form a part of the Local Government Performance Framework (LGPF) introduced in April 2008, in response to the commitment made in the local government white paper, "Strong and prosperous communities" (DCLG 2006), to implement a streamlined performance framework.

[21] The comprehensive performance management framework constituted a mandatory reporting system, which was highly influential in guiding the work at different government departments. The framework included the Comprehensive Spending Reviews (CSRs), which lay the basis for the establishment of the Departmental Strategic Objectives (DSOs), agreed with the Treasury (via the Prime Minister's Delivery Unit – PMDU) for a three-year period at a time, and the cross-government key priorities, called Public Service Agreements (PSAs). The PSAs and DSOs were linked to budget allocation within the government, as each department was accountable to the Treasury for their delivery. On the significance of the performance measurement system within the UK government more generally, see e.g. James (2004), Le Galès (2004), and Hood (2006; 2008). The new coalition government abolished the performance management framework in the summer 2010, soon after having entered office.

Supply Working Group (JESS). The group was created in 2001 at the instigation of the CEO of Ofgem, who wanted energy security work to be based on 'factual' evidence base (I8),[22] and to promote mutual understanding between what have been often described as the 'hardcore' economists within the electricity and gas sector regulator, Ofgem, and the more 'pragmatic' and policy-oriented civil servants at the energy department.[23] According to many interviewees (e.g. I8; I10; I15) JESS had generated greater mutual understanding between Ofgem and DTI civil servants, by creating a common language and concepts around issues relating to energy security, and highlighting potential energy security problems. The sometimes heated discussions within the JESS group led to *framing and conceptual impacts*, by 'changing the mindsets' as one of the group members (I8) described the work, for instance through the search for consensus on the most appropriate energy security indicators and on the definitions of key terms such as supply margin (I10). Another type of framing effects took place at a 'paradigmatic' level, as exemplified by discussions and disputes concerning the role of diversity of supply as an indicator of energy security. One interviewee, a senior energy sector academic with broad experience as government adviser, suggested that the energy diversity indicator designed by a university researcher was rejected by JESS largely because the multidimensional conception of diversity underpinning this indicator would have been at odds with the mainstream-economics paradigm, which prevailed within the group.[24] Yet, one of these interviewees who had participated in the JESS work cautioned that any consensus around a given indicator would probably be short-lived, given the rapid turnover of people in the UK civil service, and because the underlying divergences would remain, even if consensus was reached at a more superficial level.

[22] The terms of reference of the Group were (JESS 2002, 3): 1) "To assess the available data relevant to security of supply, to identify the gaps in that data and develop appropriate indicators; to monitor at a strategic level, over a timescale of at least seven years ahead: (a) the availability of supplies of gas; (b) the availability of supplies of electricity and fuels used for electricity generation; (c) the adequacy of generating capacity; and (d) the adequacy of the UK's gas and electricity infrastructure;" 2) "To assess whether appropriate market-based mechanisms are bringing forward timely investment to address any weaknesses in the supply chain that are anticipated; to identify relevant policy issues and consider implications; and to report twice yearly to the Secretary of State and the Gas and Electricity Market Authority."

[23] One government interviewee involved in JESS work, while confirming this general distinction between Ofgem and DTI, nevertheless nuanced this observation by noting that different DTI officials held diverging views concerning the appropriate degree of 'market-orientation' in energy policy.

[24] This view of the dominance of mainstream economics was confirmed by another interviewee, a government official that had participated in the group's work. On the dominance of mainstream economics in UK energy policy more generally, see e.g. Mitchell (2008) and Rutledge and Wright (2011).

While apparently successful in fostering intra-governmental collaboration and learning, the JESS work cannot be described as particularly inclusive. The influence from the processes of indicator design mainly affected energy sector insiders, notably governmental actors. Given that industry and other stakeholders were kept outside of the group,[25] one can say that JESS sought to ensure that the process was deliberative rather than bargaining-based, but did not seek to ensure truly democratic deliberation (e.g. Parkinson, 2003) by including a broad range of participants in the process. Objectivity and impartiality were central preoccupations in JESS more generally. The UK Statistics Authority also expressed concerns on this topic in its assessment of the ESIs, underlining the need to ensure that the commentary accompanying the indicators was sufficiently objective (UKSA, 2009).

The JESS work provided numerous examples of situations in which the process of indicator development affected the legitimacy of various policy actors and shaped the definitions of energy security (e.g. I5; I6; I8; I15) – indicator work hence played a political role.

3.3 Influence pathway II: the influence from the indicators themselves

If the ESIs played only a modest instrumental role, and the 'process use' within JESS can best be described as 'conceptual' – consisting mainly of the creation of shared understandings among government players – did the indicators themselves play conceptual or political roles? This section will examine these more indirect types of influence generated by ESIs.

3.3.1 Conceptual role and learning: framing, agenda-setting, and creation of new shared understandings

The agenda-setting and framing effects from the ESIs can best be seen as a joint outcome from indicator design processes ('process use') and the use of the indicators in policy debate. The introduction of headline indicators helped to keep these topics on the policy agenda, firstly by

[25] According to a JESS co-chairman, membership and participation in the JESS was limited to government departments and agencies, with other government bodies than Ofgem and DTI integrated as 'associate' members. Industry associations and NGOs were consulted, but kept out of the actual work, to avoid interest-based and political bargaining from 'contaminating' the group's work.

drawing government actors' attention to these issues during the indicator development, and secondly as a result of the greater attention to key energy policy issues that the publication of indicators in these areas generated among stakeholders and the general public (e.g. I3; I10). However, the media analysis conducted as part of this study indicated that while the press frequently used climate indicators, it very seldom referred to those included in the ESIs. Instead, especially international indicators received most of the attention.

An example of what could be called 'non-policy impacts' was the above-mentioned indirect influence of ESIs on the performance management framework. To the extent that the energy-related indicators within this performance management framework were derived from the ESIs, these latter helped shape a management instrument highly influential in departmental policymaking.

3.3.2 Legitimacy and political role of ESIs

The interviewees generally acknowledged the widespread use of indicators, and to a certain extent of the ESIs, for *legitimisation* and *strategic* purposes. The use of the competitiveness indicator by the UK government to promote and legitimise its liberalisation agenda illustrates the role of indicators themselves as tools influencing the legitimacy of policies and policy actors. Many interviewees indeed argued that the government had introduced the competitiveness headline indicator primarily to demonstrate that the UK energy sector was the most competitive in the EU actors (e.g. I3; I5; I9; I10; I15). At the EU level, the competitiveness indicator served to persuade countries such as France and Germany about the need to further liberalise their energy markets. In the domestic policy arena, the indicator was used to demonstrate to the British public and stakeholders that the government was on the right track in delivering on its liberalisation agenda, and thereby legitimise the continuation of the market-oriented energy policy.

Whether the use of the competitiveness indicator for legitimisation actually produced the desired outcome, is uncertain, yet the interview findings led to presume that this type of impacts indeed did occur. However, the example of energy security indicators calls for caution in interpreting

the impacts of legitimisation efforts. The government's use of energy security indicators to justify the construction of new nuclear power plants was in fact perceived and portrayed by critics as illegitimate. Hence, government action here seems to have produced the 'non-policy effect' of compromising the trust and credibility of the government in the eyes of the public (e.g. I2; I5; I9; see also Dorfman 2008). This again highlights the difference between 'use' and 'influence': the government may well use indicators to enhance its legitimacy, yet the actual outcome may be rather the opposite, i.e. reduced trust, credibility, and legitimacy. The JESS, in turn, was seen to influence agenda-setting by drawing attention to what it portrayed as the looming energy gap and the decline in energy security (I3; I8; I10). Some sceptics suggested that the government used the ESIs merely to justify its decisions, or to pre-empt criticism by demonstrating the progress that it had achieved (I3; I5). Such legitimisation attempts illustrate the inherent interconnectedness of the political and conceptual roles of indicators: for instance, to the extent that JESS was successful in its persuasion and agenda-setting, it generated conceptual influence, by fostering its favoured definition of energy security. A recent report by the Parliamentary Energy and Climate Change Committee (HC 2011) suggests that not only has energy security regained its central role in energy policy debate, but also that energy security indicators have acquired a legitimate position among policy instruments in this field. The committee recommended, among other things, that a specific set of energy security indicators be developed, to enable annual monitoring of DECC's performance in the area of energy security.[26]

An indirect indication of the political role of the ESIs was that many government interviewees, without being prompted by the interviewer, strongly underlined the reliability and neutrality of the data and evidence produced by the authorities. This can be interpreted as a reaction to the prevailing public mistrust in public governance of science and technology (Bickerstaff et al. 2008), with 'sound science' and 'evidence-based policy' as among the key means whereby the government hopes to restore the trust (e.g. Chilvers and Burgess 2008, 1882; Holmes and Clark

[26] The report notes: "We recommend that the Government now publish a transparent set of energy security indicators as promised in the Strategic Defence and Security Review. These indicators should cover primary supply of fuels, energy infrastructure and energy users and include specific indicators on the overall level of energy demand, diversity of fuel supplies, energy prices, fuel stocks, spare capacity and capacity for demand side response. We recommend that DECC should report against a set of energy security indicators on an annual basis as part of its Statutory Security of Supply Report as its contribution to the reporting on the Strategic Defence and Security Review indicators." (HC 2011, 12, 44)

2008). The comments from our informants – both the interviewees and workshop participants – revealed not only diverging views, but also some ambiguity concerning the nature of the political role of indicators. On one hand, such a political role was often considered inevitable given the political interests involved (I10; I13; I14; I15), essential for indicator success (I6), or sometimes the primary reason for the introduction of an indicator (the competitiveness indicator). On the other hand, many informants perceived, explicitly or implicitly, that such a political role was negative (in particular in the workshop; also e.g. I1; I4; I5). They also emphasised the need to ensure the high quality of indicators in order to minimise the risk that indicators would be used incorrectly (e.g. I4; 17; I10), or highlighted the educational background (19) and 'feel for numbers' (I3; I4) as essential preconditions for the 'correct' use of indicators.

4. Discussion and conclusions: Energy sector specificities, British exceptionalism, or ESIs as a special case?

In light of earlier research on the role of expert knowledge in policymaking, it was hardly a ground-breaking finding that the UK Energy Sector Indicators (ESIs) had a very modest direct influence on the country's energy policy. By contrast, more surprising was the degree to which even the energy sector insiders used as informants in this study were unaware of the existence of these indicators. It also proved very difficult to trace the rationale behind the introduction of the ESIs, or the intended uses and users of these indicators. Some of the key reasons for the observed lack of use of the ESIs were rather straightforward: a striking absence of clarity concerning the purpose and intended target groups ('users') of the ESIs, and the weak involvement of potential users in the elaboration of the ESIs. These indicators represented a typical example of a supply-driven and non-inclusive process of indicator-production, as the ESIs were compiled from the existing indicator sets, through an expert-led process, and responded to an administrative mandate rather than to 'genuine' demand from the potential users of indicators. The absence of collaboration and coordination between the ESI work and certain other crucial indicator processes may have further reduced the likelihood of the ESIs being adopted by policy actors as an instrument in their daily work.

Despite the lack of direct use, ESIs played a conceptual role, through effects on problem framing and agenda-setting, thanks both to the indicators themselves and the processes through which they were elaborated. The ESIs also played a *political role* in that they influenced the legitimacy of policies and policy actors. However, further in-depth analysis, applying for instance ethnographic research methods and participant observation, would be needed in order to obtain a more detailed understanding of the indirect impacts of the ESIs.

The apparent absence of interest in and awareness of the ESIs was all the more surprising given the UK's role as a frontrunner in the adoption of New Public Management approaches (Bouckaert and Halligan, 2007), notably the adoption of performance indicator systems (Hood 2007, 96-97), as well as the pervasive rhetoric (if not always the practice) of evidence-based policy and "sound science" across a wide range of policymaking areas in Britain (e.g. Weldon and Wynne, 2001; Holmes and Clark 2008). The question therefore arises whether such ostensible lack of interest stemmed from 1) the characteristics of policymaking in the energy sector; 2) the specificities of policymaking style and culture in Britain; or 3) whether the ESIs simply represented an anomaly in the otherwise evidence-based UK policy landscape that would normally provide a fertile ground for the widespread use of indicators. While this research could go only some way towards answering these questions, tentative answers will in the following be presented as three interrelated propositions that could be usefully tested and explored in future research.

4.1 Energy sector specificities

A significant share of energy sector experts, be that within civil service, industry, academia or even the NGO world, are trained in disciplines such as engineering, natural sciences, and economics. One would therefore expect these experts to make frequent use indicators and other types of quantitative data in their daily work. However, many interviewees explained the weak role of the ESIs in the UK energy sector precisely by the fact that energy sector specialists already have access to – and frequently use – a wide range of data and statistics. Therefore the introduction of the ESIs did not provide added value for these policy actors. Tentative conclusion from this research suggests that the UK energy sector is characterised by a 'policy culture' that

tends to downplay indicators as an 'inferior' form of evidence, as compared to the 'hard' evidence in the form of statistics and economic cost calculations. For many of our informants, including the producers of the ESIs, indicators seemed to represent an inferior and 'dumbed-down' version of data, too dependent on subjective interpretations, and therefore susceptible to being misused and misunderstood.

However, the interviewees' seemed to be somewhat ambivalent about indicators, seeing them at times as objective, undisputed data, and at other times as unavoidably subjective, and therefore inferior quality information. A one and a single person could therefore talk about indicators as the 'data' or 'the science', but in the next sentence underline their subjective nature and the need to employ a broad range of indicators to capture the full complexity of aspects relevant for energy policy. A possible interpretation of this seeming ambiguity is that our informants placed indicators in the same basket with other types of data, and judged their quality according to the same criteria that they would use for assessing data and statistics. In such a comparison, indicators – due to their more 'constructed' character as compared to raw data – would unavoidably seem as inferior, and less objective. The apparent failure of the 'indicator language' to take root in the UK energy sector seems therefore to partly stem from its 'misfit' with the dominant 'repertoires' in this policy domain, in particular the 'economic fundamentalism' characteristic of UK energy policy since the 1980s (Mitchell 2008; Rutledge and Wright 2011) and the portrayal of evidence-based policy in terms of 'sound science' and unitary, unconditional science advice (e.g. Weldon and Wynne, 2001; Stirling, 2008).

A corollary to such a dichotomy and ambiguity between different perceptions of indicators was the hierarchy between different types of indicator use implicitly or explicitly espoused by the interviewees. In this hierarchy, the strategic use of indicators – when indicators play an explicitly political role – was either downplayed (by many, but not all, government actors) or portrayed as undesirable. An example of the latter was the critical and sarcastic tone in the comments suggesting that the government never even intended to use the competiveness indicator for anything other than to defend its own liberalisation agenda. Implicit in such a view is the presumption that the only legitimate use would therefore be one in which indicators provide 'neutral', factual information. The interviewees hence often juxtaposed the legitimate, 'correct'

use of indicators, expressed through notions such as distinguishing "red herrings" from "realities", "separating facts from fiction", or promoting "dispassionate discussions", with the constant danger that indicators would be 'misused' as a result of the alleged lack of rational, evidence-based thinking and behaviour amongst the majority of policy actors. On a more general level, the dichotomy and ambivalence has its parallel in the two opposite perspectives to sustainability indicator development, identified by Rametsteiner et al. (2011), i.e. the science-driven "knowledge-production" model and the politically driven "norm-creation" perspective.

Finally, a senior academic and long-standing government energy policy adviser suggested that the energy sector may indeed represent a 'special case' within the UK policy system. According to this interviewee, the UK energy policy had been "notoriously non-evidence based" at least until the late 1990s, driven primarily by strong lobby groups, vested interests and ideology. This comment echoes the views from some critics (e.g. Mitchell 2008), and testifies to the 'isolationism' and self-sufficiency of the energy sector evoked above, but may also to some extent explain why the government interviewees responsible for the production of data and indicators went to such lengths in seeking to persuade the researcher of the neutrality and objectivity of the ESIs. However, it is not certain that such a 'non-evidence based' policy culture would be specific to the UK rather than a trait common to energy policy across a wide range of countries. Earlier analysis of energy policy in general and nuclear sector in particular suggests that technocratic dominance may in these domains well be a rule rather than an exception in many countries (e.g. Lehtonen, 2010; Litmanen, 2009; Topçu, 2010).

4.2 UK specificities?

Not only is the UK one of the frontrunners in New Public Management, performance measurement, evidence-based policy, but the policy culture in the country can be described as 'analytical' (Gambetta, 1998), with a combination of consensual policymaking and adversarial party politics (e.g. Greenway et al., 1992, 59). Furthermore, despite the high-profile attempts at cross-sectoral integration and rhetoric about 'joined-up government', the country's policy system has arguably remained highly fragmented and departmentalised, including in the domain of

energy policy (e.g. Russel and Jordan, 2009).[27] These underlying British features further reinforce some of the characteristics typical of policymaking in the energy sector. Hence, to the extent that indicators are seen as a 'softer' and more subjective form of information than statistics, the emphasis on 'sound science' makes it harder for indicators to acquire a legitimate place in policymaking. The adversarial policy culture of the UK in turn provides a further explanation of why especially the government interviewees so strongly emphasised the high scientific quality of the indicators, presumably guaranteed by the objectivity and independence of the indicator producers. The highly 'theatrical' way in which parliamentary debates are conducted in the UK, with the strict juxtaposition between the government and the opposition, puts government actors under constant pressure to publicly justify their policies and decisions against criticism and scrutiny by the political opposition. The highly developed results-based management structures, in turn, exhibit the potential downsides of fostering gaming, justification, and risk avoidance instead of creativity and innovation (e.g. Perrin, 2002; Mulgan, 2003; Hood 2006; McLean et al. 2007). The credibility of the evidence-base acquires a particularly prominent role in such a policy atmosphere. In the context of evidence-based policy rhetoric and increasing mistrust and cynicism towards government institutions in the UK (e.g. Bickerstaff et al., 2008), the authorities probably felt the need to try and proactively dispel any doubts about the trustworthiness of the evidence they were producing.

Finally, many interviewees suggested that the fragmentation and short-termism of the UK politico-administrative structures (see also James 2004; Dunleavy et al. 2005) has further hampered the institutionalisation and wide adoption of indicators in the energy sector. According to this logic, the tradition of rotating civil servants between different government posts at relatively short intervals (as short as every 2-3 years) had deprived the ESIs from potential policy 'champions' that would promote the adoption and widespread use of these indicators within the government. The fragmented policy structure, in turn, would have reduced the appeal of especially cross-sectoral indicators, such as those of climate change and fuel poverty.

[27] Some of our interviewees also referred to such fragmentation and compartmentalisation.

4.3 Rationalism, constructivism, conflict and consensus

This case study highlighted some of the downsides of analysing the role of indicators exclusively through the lens of rationalist-instrumental policymaking, and called attention to the constructive and political-strategic aspects of indicator work. On the other hand, the case study demonstrated that completely rejecting the rationalist-instrumental view would be equally problematic; for instance, despite the complexities involved in conceptualising the issue of the role of indicators in policymaking in terms of supply and demand (Bell et al. 2011, 20-26), the mismatch between the two was indeed a key shortcoming, which contributed to the poor awareness and use of ESIs by players in the energy sector. However, a more constructivist perspective would result in additional, somewhat different, recommendations. An 'institutionalist-interpretive' point of view (Boulanger 2006) would emphasise the importance of a broader notion of indicator influence (instead of mere 'use') and the need to understand the general political and institutional context which governs the production, use and influence of indicators. The challenge is not to identify the 'correct' perspective to analysing the role of indicators in policymaking, but instead to establish a more balanced approach, by moving away from the almost exclusive emphasis on the rationalist-instrumental model, which tends to see the strategic and political aspects merely as a distraction.

More specific to the ESIs, and beyond the issues of energy sector and UK specificities addressed above, an institutionalist-interpretive perspective raises a further question concerning the ambiguous role of consensus and conflict in indicator work. Consensus-seeking may well be essential in attempts to achieve 'intended use by intended users', yet the conflicts encountered in, and reinforced by, ESI work appeared as among the most powerful potential sources of influence. An exclusive search for consensus would probably have suppressed disagreements and concealed power asymmetries, thereby compromising the potential for social learning. Further research could usefully seek to analyse the respective roles of consensus and conflict at different stages and contexts of indicator 'life-cycles'.

4.4 ESIs as an exception?

Finally, the third possible explanation prompts a word of caution concerning the generalisability of the conclusions from this case study across the different areas of the UK energy sector or UK policymaking more generally. In a strict sense, the conclusions from this case study only apply to the lack of use of the ESIs as a specific indicator set that the government introduced in the UK energy sector. While the ESIs were neither well-known nor used by many policy actors in the UK energy sector, these same actors frequently use statistical information and to a certain extent also indicators – produced by the government but also by other players. At the level of discourse, however, the 'indicator language' clearly has not penetrated the UK energy sector to the same degree as has been the case for instance in the area of environmental policy. In particular, there was a striking difference between the near-absence of use of the ESIs as compared to the omnipresence of the performance management indicators, through the public service agreement (PSA) framework. When compared with the performance management indicators, the ESIs suffered from the absence of carrots and sticks, i.e. direct sanctions for non-compliance, as well as from lack of ownership and clearly identified demand for the indicators. Furthermore, the political role of the ESIs was compromised by the low level of trust among the public in government as a source of information.

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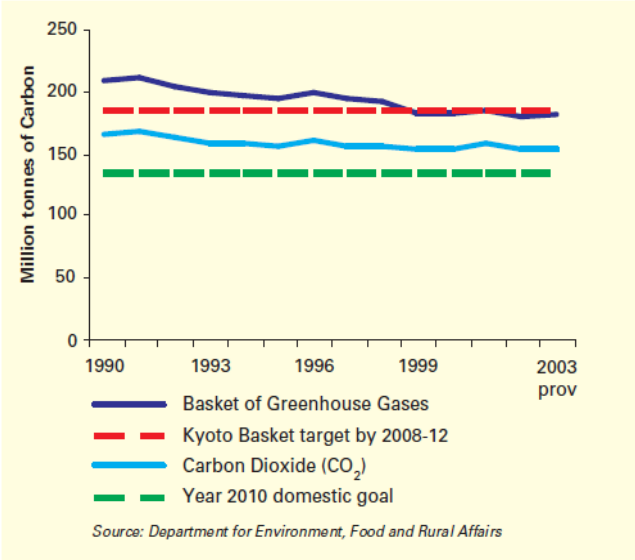
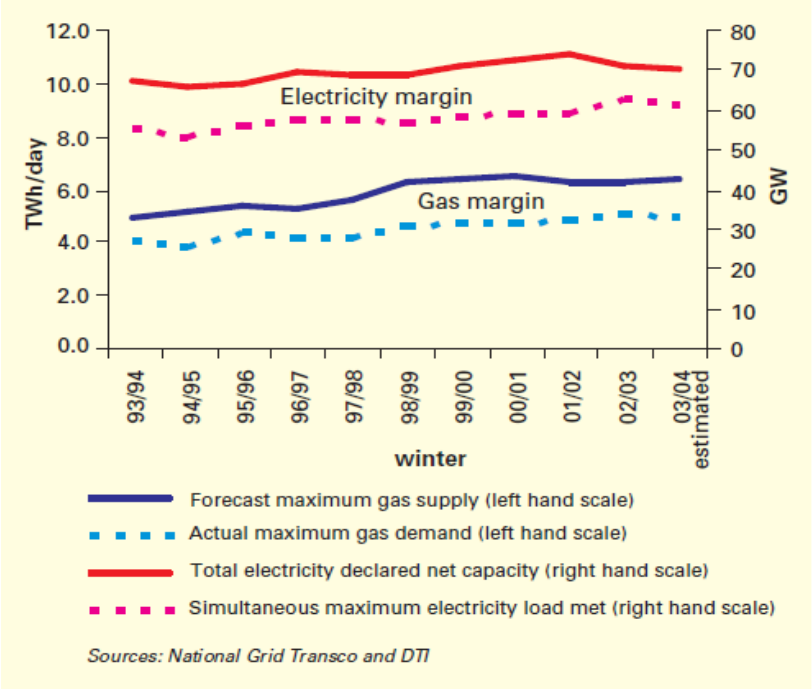
Annex A. The headline indicators and the accompanying graphic illustrations published in the 2004 edition of the UK Energy Sector Indicators (DTI 2004).

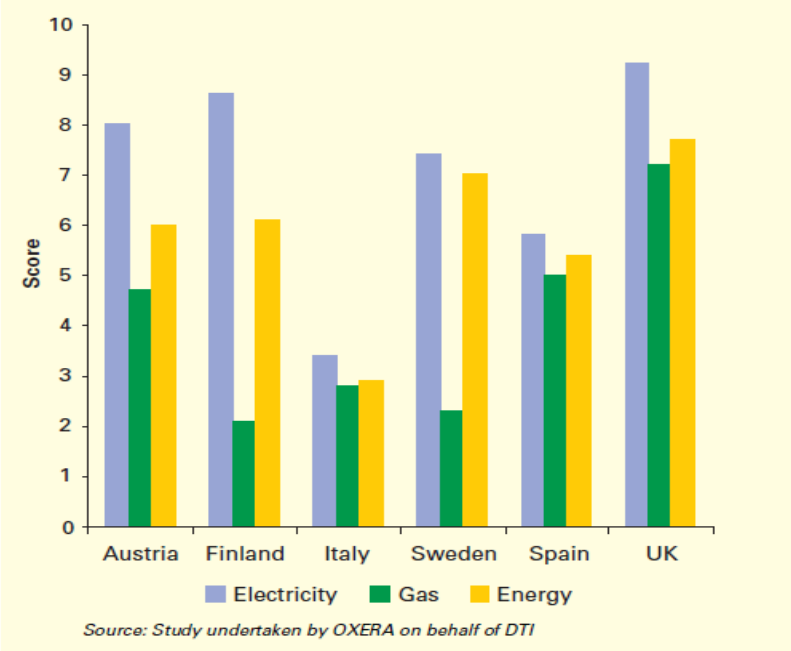
1. Low carbon: Greenhouse gas and carbon dioxide emissions



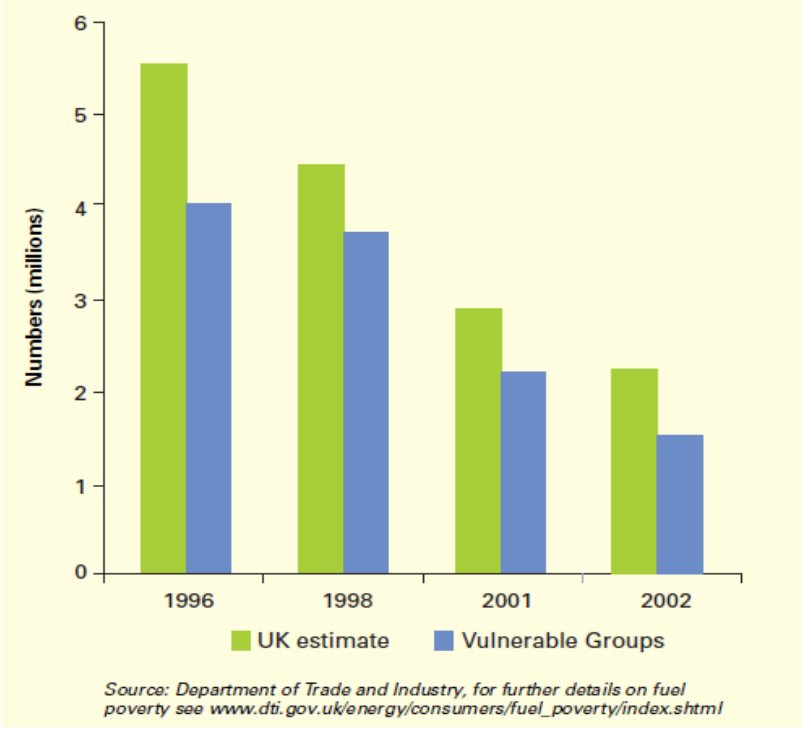
2. Reliability: Gas and electricity capacity margins - maximum supply and maximum demand 1993/4 to 2003/4



3. Competitiveness: Overall competitiveness score for selected EU energy markets (using provisional 2002 data)



4. Fuel Poverty: Number of households in Fuel Poverty (UK)



Annex B. The 28 supporting indicators, as presented in the 2004 ESI publication (DTI 2004).

Low carbon economy

1.1 Carbon dioxide emissions on an IPCC basis and measurement towards targets
1.2 Final energy consumption by sector
1.3 Carbon dioxide emissions per unit of GDP
1.4 The energy ratio
1.5 Share of fuels contributing to primary energy supply, fossil fuel dependency
1.6 Proportion of electricity generated by renewables
1.7 Utilisation of CHP capacity
1.8 Energy consumption (intensity)
1.9 Energy Intensities for road passengers and freight
1.10 Specific energy consumption for households
1.11 Average new CO2 emissions

Reliability

2.1 Electricity generating capacity, average load factor and simultaneous max load met for major power producers
2.2 Gas capacity - maximum supply, maximum demand and peak 1 in 20 winter estimated demand
2.3 Security and availability of electricity supply for the average customer
2.4 Shares and diversity of fuels used for electricity generation)
2.5 Diversity of primary energy supply)
2.6 Diversity of oil imports
2.7 Diversity of supply of primary fuels

Competitiveness

3.1 Changes in the productivity of the energy industries
3.2 Percentage of Gross Value Added accounted for by energy expenditure
3.3 Fuel prices indices for the industrial sector
3.4 Industrial gas prices within the EU and G7
3.5 Industrial electricity prices in the EU and G7

Fuel poverty

4.1 Total number of households in fuel poverty
4.2 Trends in fuel poverty by severity
4.3 SAP rating of households in the lowest 30 per cent 30 income groups and average SAP rating for England
4.4 Fuel prices indices for the domestic sector
4.5 Fuel expenditure as a percentage of total expenditure by income group

Annex C. Data and methods

The case study drew mainly on the analysis of government documents relating to the UK Energy Sector Indicators, semi-structured interviews with 15 experts, stakeholders and civil servants from the energy sector (indicated in text as I1, I2, I3, etc.); participant observation in a stakeholder workshop on energy sector indicators organised within the research project; an analysis of the appearance and treatment of indicators in the UK national press; and more tacit knowledge accumulated over the years (since October 2005) through discussions with UK energy sector experts and policy actors in various seminars and conferences.

The official documents analysed included the annual reports presenting the ESIs; annual reports from the JESS group; energy policy white papers since 2003; and a limited number of parliamentary select committee reports. The aims of the documentary analysis were to obtain a thorough understanding of the ESI indicators and their evolution over time, identify the occasions at which these indicators were mentioned in the publications published by the authorities, and examine the specific ways in which indicators were discussed in these reports.

The interviews were conducted between March 2009 and October 2010 with individuals having a long experience from energy policy. While many of the interviewees had held various positions in different parts of the energy sector, their primary affiliations can be categorised as follows – based on the principal reason why the interviewee was chosen for this study:

- Private sector & civil society groups (3 interviews)
- Academics (2)
- National-level energy authorities (7)
- Regional-level energy authorities (1)
- UK Cabinet Office (2)

Minutes were written on the basis of each interview, and sent for comments and corrections to the interviewee in question.

A survey of the press was conducted in order to identify the prevalence of indicator-related discussion in the main UK national newspapers (excluding the Financial Times). See Annex D for details.

Finally, information was obtained through participant observation in a stakeholder workshop on energy indicators organised at the University of Sussex in February 2010, as part of the Work Package 6 of the POINT project. The thirteen participants in the two-day workshop represented the academia (7), government energy and climate experts (3), local government (1), private sector research and consultancy (1), and NGOs (1). The objectives of the workshop were to enable triangulation of data and to provide further insights into the use and influence of indicators by exploring how potential 'users' of indicators engage with the tools and what constraints shape the use and influence of indicators. The workshop provide an opportunity to observe, in a near "real-life situation", 1) the attitudes of the participants concerning energy sector indicators among individuals whose daily work involved at least some use of energy indicators, and 2) the behaviour of these individuals in small-group situations concerning indicators of sustainable development. Recruiting people for the two-day workshop turned out to be extremely challenging, and the process of recruitment provided plenty of further evidence of the very limited level of knowledge and interest in the ESIs among the UK energy sector actors.

Annex D. Media analysis

Many interviewees mentioned the modest or non-existent visibility of ESIs as well as performance measurement indicators in the media and public debate. Understandably, the media tends to concentrate its reporting on actual policy issues, rather than on indicators. To verify this claim, a press survey was conducted to identify press articles evoking the term 'indicator' and any of the four UK energy policy goals. The analysis provided further support to the overall findings from the interviews: not only the ESI set, but also the term indicator was notoriously absent from media articles concerning energy policy in general and the four UK energy policy objectives in particular. Usually, when indicators were evoked, reference was made either to economic indicators, or to 'new' indicators such as alternative measures of well-being, international-level indicators comparing countries' performance in environmental protection or greenhouse gas mitigation or carbon footprint of food.

All in all 1039 articles from the past eight years (23/10/2002 – 22/10/2010) were found on the Nexis database, using the search terms "energy security", "climate", "competitiveness", "fuel poverty" and "indicator". Applying the search term "energy" to this text corpus, 210 texts were included in the final analysis.

Analysis of the articles showed the virtually total absence of the Energy Sector Indicators in the media. Especially with the onset of the economic crisis, at most occasions when the term 'indicator' was evoked, it was with reference to economic indicators, i.e. the dominant topic in most of the articles was economy – not the objectives of energy policy. In those rare cases where other than conventional economic indicators were evoked, this was in relation to topics such as:

- The need for alternative indicators
    - this was a dominant theme in the media following the government's release of the Energy White Paper in 2003, which was accompanied by the release of a set of "quality-of-life indicators".
- Geo-biological indicators such as changes in bird populations or melting of the glaciers, suggested sometimes as indicators of climate change

- Indicators to measure the carbon footprint of food, reporting e.g. on studies calling into question the idea of "local food" or "food miles" as good proxies for the greenness" of our food consumption habits.
- Greenhouse reduction targets and the associated indicators demonstrating that the UK government was lagging behind its objectives.
- International indicators comparing UK performance (e.g. environmental performance indicators), especially when the indicators portray the UK in a negative light

A similar further search was done on the Nexis database, again within the main UK national newspapers from the past nine years. The keywords and the search results were as follows:

1. "Fuel poverty" and "evidence": 120 articles
2. "Fuel poverty" and "indicator": 21 articles
3. "Climate change" and "indicator": 484 articles
    - Among these, those containing the word "energy": 146
4. "Greenhouse gas" and "indicator": 39 articles
5. "Energy security" and "indicator": 9 articles, none of which mentioned the UK Energy Sector Indicators

Again, the findings confirmed the earlier conclusion about the very limited media attention to the indicators. National fuel poverty indicators were used, for instance, in an article concerning the potential of renewable energy in Shetland Islands, in order to put the island's fuel poverty situation into national context. Only five articles could be identified in which the issue of fuel poverty indicators was addressed. This included an article reporting on an assessment of the fuel poverty programme "Warm Front", by the National Audit Office, calling into question the quality of the indicators used for allocating support under the Warm Front programme. Finally, the regional quality-of-life indicators mentioned above received some attention.

The analysis therefore confirmed the opinions of the interviewees on the low visibility of the ESIs in the media. The Energy Sector Indicators had generated very little debate, if any, in the

national press, and their potential impact therefore takes place primarily through the intra-governmental processes within the energy sector.